

Project Name: Assessing multi-trophic impacts of microplastic pollutants across macroinvertebrate food webs in Matagorda Bay, Texas

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Contract No: 0046

Reporting Period: 12/01/2024-02/28/2025

Task I: Collect free plastic pollutants found along coastal and wetland environments in Matagorda Bay to develop baseline information on chemical composition and pollution level within microplastic loads.

Status of the task during this reporting period: not started in progress completed

- Describe the major accomplishments for this reporting period
 - *Performed Fourier Transform Infrared Spectroscopy (FTIR) to process samples (water, sediment, vegetation, macroinvertebrate) from Fall 2024 sampling period. All water samples have been processed, sediment, vegetation, and macroinvertebrate is ongoing.*
 - *Graduate student associated with Task I defended thesis February 2025. Expected graduation May 2025.*
- List the deliverable(s)/milestone(s) completed during this reporting period
 - *Developed manuscript of standard protocol for filtering, sorting, and calibrating sediment and saltwater samples for microplastic and nanoplastic assessment. Manuscript submitted for publication and currently in revision.*
 - *Graduate student thesis in revision with expectation for open access publication Summer 2025.*
- Were there any problems or obstacles encountered during this reporting period (e.g., delays, remedial action taken, schedule revision). Yes No If Yes, please explain:
- Briefly describe plans for the next reporting period.
 - *Will complete analysis of sediment, vegetation, and macroinvertebrates from Matagorda Bay and adjacent bays (East/West Matagorda, Tres Palacios, Turtle, Vaes, Keller, Cox, Lavaca, and Chocolate) for 2024 calendar year for continued calibration and assessment of chemical composition and pollution loads.*
 - *Will conduct additional field survey to collect water, sediment, vegetation, and macroinvertebrates from Matagorda Bay and adjacent bays in Summer 2025.*
 - *Review manuscript of standard protocol for microplastic assessment and resubmit based on revisions by next quarter.*
 - *The team will continue to compare inventories of baseline samples and historical record to identify taxa for microcosm experiments as part of Task II and Task III.*

Task II: Determine the presence, identity, and concentration of toxic or unique chemicals/elements found in plant tissues following the introduction of free plastic pollutants and how these pollutants impact plant growth, development, and nutritional content.

Status of the task during this reporting period: not started in progress completed

- Describe the major accomplishments for this reporting period
 - *Graduate student research associated with Task II (i.e., field sampling and experimental microcosm) is ongoing. Micro and macrophyte tissues obtained from field surveys for Task I. FTIR is ongoing.*
 - *Microphyte and macrophyte taxa undergoing colonization for microcosm experiment prep as part of Task III.*
- List the deliverable(s)/milestone(s) completed during this reporting period
- Were there any problems or obstacles encountered during this reporting period (e.g., delays, remedial action taken, schedule revision). Yes No If Yes, please explain:
- Briefly describe plans for the next reporting period.
 - *We will purchase additional tanks and other materials necessary for microcosm study for Spring and Summer 2025.*
 - *Will continue to collect additional water, sediment, vegetation, and macroinvertebrates from Matagorda Bay and adjacent bays (East/West Matagorda, Tres Palacios, Turtle, Vaes, Keller, Cox, Lavaca, and Chocolate) for continued calibration and assessment of chemical composition and pollution loads for Spring and Summer 2025.*

Task III: Determine the presence, identity, and concentration of toxic or unique chemicals/elements of free plastic pollutants found in macroinvertebrates (herbivores, detritivores, and their predators) and how these pollutants impact macroinvertebrate growth, development, and behavior.

Status of the task during this reporting period: not started in progress completed

- Describe the major accomplishments for this reporting period
 - *Microcosm experiment concluded for partial completion of Task III including Calanoid copepods (Acartia spp.) and cannonball jellyfish (Stomolophus meleagris). Analyses to be presented via graduate student thesis defense Spring 2025.*
 - *Microcosm experiment animal use protocols (AUP) approved at primary institution for macroinvertebrates (e.g., crustaceans, gastropods, insects). Selection of crustacean (Daphnia) and insect (Odonata) for candidates for study. Developed additional AUPs for crustacean taxa candidates for study.*
 - *Macroinvertebrate taxa undergoing colonization for microcosm experiment prep as part of Task III.*
- List the deliverable(s)/milestone(s) completed during this reporting period
 - *Graduate student researcher presented proof of concept of microcosm experiment (crustaceans, insects) for Task III at Gulf and Estuarine Research Society Annual Meeting, December 2024, in Fairhope AL, and at Texas Chapter of the Wildlife Society, February 2025, in Denton TX.*
- Were there any problems or obstacles encountered during this reporting period (e.g., delays, remedial action taken, schedule revision). Yes No If Yes, please explain:
- Briefly describe plans for the next reporting period.
 - *Graduate student researched associated with microcosm experiment for Calanoid copepods and cannonball jellyfish expected to defend thesis April 2025 and graduate May 2025.*
 - *Microcosm associated with crustaceans and insects ongoing; study to continue into Spring and Summer 2025*
 - *We will purchase additional tanks and other materials necessary for microcosm study for Spring and Summer 2025.*